

WHAT IS CLAIMED IS:

1. An actuator comprising:
  - a coil of wire carrying current to form a magnetic field generated by separate magnetic components;
  - a cooling tube having cooling liquid flowing therethrough in proximity of the coil of wire but outside the coil of wire, and wrapped around a periphery of said coil of wire; and
  - a plurality of thermal conductive strips arranged generally transverse to at least portions of said coil of wire so as to conduct heat from said coil of wire to said cooling tube.
2. The actuator coil of claim 1, further comprising a cooling jacket around one side of said coil of wire and around said cooling tube.
3. The actuator coil of claim 1, wherein said plurality of thermal conductive strips are arranged in a coil.
4. The actuator coil of claim 1, wherein said plurality of thermal conductive strips are arranged side-by-side.
5. The actuator coil of claim 1, wherein each of said plurality of thermal conductive strips includes a microtube with a cooling liquid flowing therethrough.
6. The actuator coil of claim 1, wherein said plurality of thermal conductive strips are formed of a metal.
7. The actuator coil of claim 1, wherein said plurality of thermal conductive strips are formed of any one of steel, gold, aluminum, copper, graphite and graphite fibers.

8. The actuator coil of claim 1, wherein said coil of wire is a racetrack winding.

9. The actuator coil of claim 1, wherein said coil of wire is a flat coil.

10. The actuator coil of claim 1, wherein said coil of wire is a plurality of overlapping coils.

11. A coil plate assembly comprising:  
a base plate;  
a cooling tube having a cooling fluid flowing therethrough;  
a plurality of coil windings arranged symmetrically around said base plate and perpendicular to said base plate, each coil winding generating a magnetic field, wherein said cooling tube is wrapped around a periphery of said coil winding;

each coil winding further including a plurality of thermal conductive strips arranged generally transverse to at least portions of said race track winding so as to conduct heat from said coil winding to said cooling tube.

12. The coil plate assembly of claim 11, further comprising a plurality of focusing coils mounted on said base plate.

13. The coil plate assembly of claim 11, further comprising a cooling jacket around one side of said coil winding and around said cooling tube.

14. The coil plate assembly of claim 11, wherein said plurality of thermal conductive strips are arranged in a coil.

15. The coil plate assembly of claim 11, wherein said plurality of thermal conductive strips are arranged side-by-side.

16. The coil plate assembly of claim 11, wherein each of said plurality of thermal conductive strips includes a microtube with a cooling liquid flowing therethrough.

17. The coil plate assembly of claim 11, wherein said plurality of thermal conductive strips are formed of a metal.

18. The coil plate assembly of claim 11, wherein said plurality of thermal conductive strips are formed of any one of steel, gold, aluminum, copper, graphite and graphite fibers.

19. The coil plate assembly of claim 11, wherein said plurality of thermal conductive strips includes a plurality of stacked insulated wire staples.

20. The actuator coil of claim 11, wherein said coil of wire is a racetrack winding.

21. The actuator coil of claim 11, wherein said coil of wire is a flat coil.

22. The actuator coil of claim 11, wherein said coil of wire is a plurality of overlapping coils.

23. A motor coil comprising:  
a coil of wire carrying current to form a magnetic field generated by separate magnetic components;

a cooling tube having cooling liquid flowing therethrough in proximity of the coil of wire but outside the coil of wire, and wrapped around a periphery of said coil of wire; and

a plurality of thermal conductive strips arranged generally transverse to at least portions of said coil of wire so as to conduct heat from said coil of wire to said cooling tube.